

REMARKS/ARGUMENTS

Claims 3-22 have been canceled. New Claims 23-44 are active in the case.

Reconsideration is respectfully requested.

The present invention relates to radiation curable compounds having capped amino groups.

Claim Rejection, 35 USC 112

The limitation concerning the allophanate fraction in previously active Claim 19 has now been incorporated into new independent Claim 23. The limitation has also be incorporated in new Claims 42 and 44 (previously active Claims 3 and 20). New Claims 24-28 correspond to previously active Claims 4-8. New Claims 29 and 30 are supported by disclosure at page 23, lines 8-16 and page 19, lines 36-38, respectively. New Claim 31 is supported by previously active Claim 42. New Claims 32-41 are supported by previously active Claims 9-18. New Claim 43 is supported by previously active Claim 22. Accordingly, entry of the amendments into the record of the case is respectfully requested.

Claim Rejection, 35 USC 102

Claims 3-5, 7, 8, 14, 15, 17, 19 and 21 stand rejected based on 35 USC 102(b) as anticipated by Kuroda et al, EP 0,965,604. This ground of rejection is respectfully traversed.

Claims 3-5, 7, 14, 15, 17, 19 and 21 stand rejected based on 35 USC 102(b) as anticipated by Paar et al, U. S. Patent 4,684,702. This ground of rejection is respectfully traversed.

Claims 3-5, 7-10, 14, 15 and 17-22 stand rejected based on 35 USC 102(b) as anticipated by Leitner et al, U. S. Patent 4,349,655. This ground of rejection is respectfully traversed.

Applicants emphasize that an important aspect of the invention as broadly claimed is that the products obtained contain or have an allophanate group or fraction content of 5 to 65 mol %. (Allophanate groups can be formed in the reaction of isocyanate groups with alcoholic groups.) The result of this reaction is that the allophanate group containing products exhibit low viscosities, which is desirable from the point of view of the use of the product. This fact is demonstrated in the examples of the application. Example 1 of the application describes the reaction of hexamethylene diisocyanate (1 mol NCO groups) with 0.5 mol of hydroxyethyl acrylate and 0.5 mol of 1-hydroxyethyl-2-isopropyl-1,3-oxazolidine. (This mixture is comprised of the same molar amounts of isocyanate reactant and the sum of the amounts of the two hydroxyl group containing reactants.) The reaction is conducted in the presence of dibutyltin dilaurate. The result of the reaction is a product that is isocyanate group free and is a diurethane, i.e., a statistical mixture of possible diurethanes. Note that it is well known that the presence of dibutyltin dilaurate as a catalyst is selectively effective in leading alcoholic groups to produce urethane linkages, but does not lead to the formation of allophanate groups. By contrast, Example 2 (Table 1) describes the procedure of reacting hexamethylene diisocyanate first with an amount of hydroxyalkyl (meth)acrylate in the presence of the catalyst N,N,N-trimethyl-N-(2-hydroxypropyl)ammonium 1-ethylhexanoate. (This catalyst does not lead to the formation of urethane linkages, but rather a product is formed which contains allophanate groups as well as free isocyanate groups.) The viscosity data in Table 1 show the relatively low viscosities of the product embodiments obtained. Example 3 of the specification describes the use of reaction Product 4 from Table 1 which is comprised of allophanate groups and has a free NCO content of 16.3 % with the hydroxyl group containing oxazolidine compound identified in the example, whereby urethane linkages are formed via the alcoholic groups, not allophanate groups. The result is that whereas the non-allophanate group containing diurethane product of Example 1 is a solid that

has a melting point of 70 to 80° C, the allophanate group containing product of Ex 3 is a low viscosity fluid. The favorable effect of low viscosity imparted by allophanate groups is demonstrated in the examples. It is well known to those of skill in the art that a catalyst such as dibutyltin dilaurate selectively promotes the urethane formation reaction, while a catalyst such as N,N,N-trimethyl-N-(2-hydroxypropyl)ammonium 1-ethylhexanoate selectively promotes allophanate group formation.

As to the matter of the Kuroda et al patent, Examples 1 and 2 thereof disclose the reaction of an isocyanate and 2-hydroxyethyl oxazolidine in the presence of dibutyltin dilaurate. As a result the products obtained upon reaction contain urethane linkages, but not allophanate linkages. Thus, the products of the reference are not within the scope of the present polyurethane.

The Paar et al patent discloses the preparation of monoisocyanate intermediates UM 1 to UM 3 by reactions in which a catalyst is not present. As shown in Table 2 these intermediates are reacted with oxazolidines again in the absence of catalyst. Thus, these products are comparable to the results of present Example 1 in which urethane linkages are formed, but not allophanate groups.

Finally, the Leitner et al patent discloses the reaction of a diisocyanate and a hydroxy oxazolidine compound (col 2, lines 50 to 59 and col 4, line 3). Again, no catalyst is present in the reaction, and therefore, no allophanate groups are formed. Accordingly, none of the three cited patents disclose the present invention and withdrawal of the anticipatory rejections are respectfully requested.

Claim 6

Claim 6 is directed to a secondary aspect of the invention upon which patentability does not depend. In fact, Claim 6 incorporates the patentable feature of the independent

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Claim upon which it depends (New Claim 26 depends on new Claim 23.) Accordingly, since the cited Bruchmann et al patent does not overcome or improve upon the deficiencies of the cited Paar et al, Kuroda et al and Leitner et al with respect to the present invention, withdrawal of the rejections of Claim 3 based on 35 USC 103 is respectfully requested.

As to the Bradford et al patent, the same discloses a dual cure coating composition that is comprised of a radiation curable component (a1), a thermally curable binder component (a2) and a thermally curable crosslinking component (a3). As such, the cross-linker is a diisocyanate. This patent, accordingly, does not show or suggest the specific reactions at issue in the formation of the present polyurethane, whereby depending upon the catalyst used in the reaction between a diisocyanate or polyisocyanate and an alcoholic compound, a product is formed which either does or does not form allophanate groups depending upon the choice of catalyst, thereby resulting in a low viscosity fluid product. Accordingly, the Bradford et al reference does not improve upon the deficiencies of the primary references, and withdrawal of the obviousness grounds of rejection is respectfully requested.

It is now believed that the application is in proper condition for allowance. Early notice to this effect is earnestly solicited.


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